

# IMPROVED HARD BIAS STRUCTURE WITH ANTIPARALLEL LAYERS

## ABSTRACT

A magnetic head having a sensor with a free layer, the free layer having a magnetic moment. Hard bias structures are positioned towards opposite ends of the sensor, the hard bias structures stabilizing the magnetic moment of the free layer. Each hard bias structure includes an antiparallel (AP) pinned layer structure and an antiferromagnetic layer positioned towards each of the AP pinned layer structures. Each AP pinned layer structure has a middle pinned layer aligned along a plane of the free layer of the sensor, and outer pinned layers positioned on opposite sides of the middle pinned layer. Each antiferromagnetic layer stabilizes a magnetic moment of the pinned layer closest thereto.